The Inefficiencies and Inequities Associated with Decline: Some New Options for Improving Education in Latin America

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Abstract

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The 1980s have been years of great economic difficulty, falling
real per capita income, and a level of debt that now is larger rela-
tive to the new lower per capita incomes in most of Latin America and
Africa. In the nine Latin American countries studied in depth (i.e.,
Brazil, Costa Rica, Dominican Republic, Jamaica, Chile, Venezuela,
El Salvador, Argentina, and Bolivia), this has generally been asso-
ciated with falling real expenditure per capita on education, deter-
iorating quality (as evidenced by falling test scores), and lower
efficiency as the more cost effective inputs are cut more severely
(e.g., textbook budgets). Although there has been some economic re-
covery in some of the countries, the serious inflation rates in Brazil,
Bolivia, and Argentina do not bode well for recovery soon. The evi-
dence also suggests that there are adverse effects on equity during
decline, with larger percentage cuts in education budgets for the
poor, and larger increases in drop-out rates in poor areas.

Policy options discussed include using the specific prototype
school aid formula presented here to provide stronger incentives for
efficiency and equity, and increasing resource recovery in higher
education together with use of the current means-testing methodology
described here to avoid driving out the promising students from the
lower income families.

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The 1980s have been years of great economic difficulty and falling real per capita income in most of the nine Latin American countries studied in this paper, countries within which in-depth education sector reviews have recently been conducted by the World Bank. Only recently recovery has begun to occur in some of those countries. But inflation rates are well over 300 percent in Brazil, Bolivia, and Argentina, which does not bode well for continuing recovery, and all countries but Brazil remain considerably below their 1980 real per capita income levels.

This economic decline has been associated with even larger decreases in per student real education funding. What limited evidence there is suggests that this falling real expenditure per student tends to be associated with a decline in quality, with falling test scores (after a lag), and with higher drop outs. Since there are incentives to maintain enrollments both from population pressure as the number of children continues to grow, and from funding that is tied but only in part to the level of enrollments, enrollments do not fall, at least at first. Again the evidence is limited, but in some countries in Latin America and in 13 out of 39 countries in Africa for which data is available in Gallagher and Ogbu (1989) (only two of which were preoccupied with war activities), enrollment as a percent of the number of children in each age group has begun to fall. With recovery beginning to occur in some of the Latin American countries, and the number of school age children continuing to grow, there is no evidence that aggregate enrollments are falling. But there is some evidence that aggregate enrollments would eventually fall if the decline were severe and protracted, as they are doing currently in Mali and Somalia.

However it is a matter of serious concern in Latin America that the reduction in the quality of education, decline in pupil achievement, and slower or stagnating improvement in enrollment ratios has adverse implications for economic development. Reductions in educational quality can have undesirable labor market effects by reducing the supply of labor qualified to participate in a modernizing economy, and thereby lower overall economic efficiency. The higher drop-out rates among the poor, and the larger decline in enrollment ratios in poor rural and urban areas than in high income suburbs limits the future earning capacity of the children of the poor more disproportionately. This effect increases inequity, which is already a serious problem in several of these Latin American nations, and it also tends to increase the inequality of earnings in the next and future generations.

Until the major factors forcing education to make do with less are reversed, the best hope is to take steps to maintain or to improve efficiency and equity in order to minimize the decline in educational quality, and to minimize the adverse impact on the poor. This involves considering the dynamic impact of education budget cuts on efficiency and equity in education in Latin America, as well as some new policy options set out in sufficiently specific terms for effective action. It uniquely involves looking at the dynamics of the process-- i.e., what typically is cut first, second, and last--and given what is known about the cost effectiveness of each type of input, inquiring into the implications of this for efficiency, as well as for equity.

In Part I, the pattern that emerges in these nine Latin American countries will be developed. It will stress the economic forces driving the decline in education budgets and in quality, especially falling real per capita income combined with larger numbers of school age children as the result of population growth, and the implications for efficiency in education. The pattern will be compared to world- wide patterns of educational expansion, and decline, in high, middle, and low-income countries. It will also be considered in light of what patterns have been found in various African and Asian nations in which education sector reviews have been done.

In Part II, the implications of the decline in per student re- sources for equity in education in these Latin American countries will be developed. Although attention is given to the rates of change and what can be done to minimizing damage in this context, there are important basic continuing sources of inequity that must be con- sidered.

In Part III, the focus is on major issues and policy options. There is analysis of several things that seem to work better in two or three of the countries.

The remaining Parts IV and V focus on specific things that can be done. Their common theme is improving the incentives that exist for achieving efficiency and pupil-equity within education. Part IV considers the way educational systems are financed--the sources of perverse incentives in the way school-aid is distributed by the cen- tral government (or the provinces) that contribute to high drop-out rates and other sources of internal inefficiency and inequity. A specific prototype tool is suggested in the form of an objective model school-aid formula. It could be refined, adapted to the situation in each nation, and promoted by the Bank as a means of strengthening the internal incentives for efficiency, and incentives for decentralization in financing and decision making, while also providing for pupil-equity. Part IV also focuses on the incentives internal to each school district, in this case for improving the cost effectiveness by choosing a more efficient input mix. The incentives for greater equity are also considered, such as the possibility of making World Bank sector loans conditional on measured progress in poor areas. Part V summarizes the conclusions and the major policy options.

I. The Current Challenge

There are several key patterns emerging as the result of basic economic and demographic forces throughout South and Central America that are evident in the nine Latin American countries studied.

Key Patterns: An Overview

The basic patterns are the decline in per capita income in the period since 1980 in all of the countries except Brazil, as shown in the first column of Table 1. This is known to be a major factor giving rise to sharp reductions in the real expenditure per capita on education (see McMahon (1989a) and Gallagher and Ogbu (1989, p. 24) that is shown in Col. 7 of Table 2). When this is combined with sustained and moderately high rates of population growth as shown in Table 1, this leads to more school age children and continuing pressure on enrollments. Given this decline in per capita and per pupil expenditure, what evidence there is suggests that the things cut first tend to be those things that are most cuttable, such as text-books and teaching materials (as will be shown later in Table 7) which are relatively cost effective. The tendency then is for test scores to decline (Tables 3-5) and drop-out rates to increase (Table 8). Finally, education in the poorest neighborhoods and rural areas where schools are least able to sustain themselves tends to be cut by dis-proportionately large amounts, as shown in Table 8. The result is deteriorating efficiency, falling quality and increasing inequity.

The Real Per Capital Income Decline

Specifically in Table 1 it can be seen that since 1980 real per capita income has risen by only .5% per year in Brazil (as compared to 1.9% in the 19 industrial economies), and has fallen in all of the other Latin American countries studied. Ranked from the best per-formance to the largest decline in real per capita income since 1980, the percent decline in real GDP for Costa Rica is -1.1% per year, Dominican Republic -1.3%, Jamaica -1.5%, Chile -1.7%, Venezuela -2.0%, El Salvador -2.2%, Argentina -2.4%, and Bolivia -5.7% per year. There has been some recovery in 1986-89 in all of these countries, with the exception that recovery was delayed in Bolivia and disrupted in El Salvador. But several negative or zero real per capita growth rates continue, and inflation rates remain disastrously high in Brazil (157% for 1980-86 and over 700% recently), Argentina (326% and higher recently), and Bolivia (683%). This suggests that more "structural adjustment," rising unemployment and falling real per capita income is yet to follow in these three major countries.

Table 1

Factors Driving Educational Decline
in Latin America*

	Average Annual Real Per Capita Income Growth		Average Annual Population Growth	
	1980-86	1965-86	1980-86	1981-87
Brazil	.5%	4.3%	2.2%	2.2%
Costa Rica	-1.1	1.6	2.4	2.9
Dominican Republic	-1.3	2.5	2.4	2.4
Jamaica	-1.5	-1.4	1.5	1.4
Chile	-1.7	-.2	1.7	1.7
Venezuela	-2.0	.4	2.9	2.8
El Salvador	-2.2	-.3	1.2	1.2
Argentina	-2.4	.2	1.6	1.4
Bolivia	-5.7	-.4	2.7	2.7
High Income Economies	1.9%	2.3%	.6%	
Middle Income Economies	0%	2.6%	2.3%	
World's 6 Fastest Growing Countries**	5.4%	6.2%	1.8%	

*Source: World Development Report, 1988.
**These are South Korea (6.8%), Hong Kong (4.8%), Singapore (4.2%),
Japan (3.0%), Cameroon (5.0%), and Botswana (8.4% per year since
1980).

Population and Enrollment Growth

Population growth rates are highest in Bolivia (2.7%) and Venezuela (2.9%), as compared to much lower rates in the world's fastest growing countries (1.8%) and in the industrial countries (.6%) as shown in Table 1. These rates tend to fall as larger percentages of women complete education through 9th grade, which gives them economic options in the labor force other than work in agriculture and the rearing of children, and tends to be associated with lower fertility rates (for evidence see McMahon, 1989b).

The basic model and empirical evidence on rising per capita real income and growing numbers of children as key determinants of school expansion, and the reverse with decline, are developed in McMahon (1989a). The pattern has been falling expenditures per pupil but rising numbers of children in these nine Latin American countries, leading to growing enrollments but falling expenditure per pupil and declining quality. This is part of the broader worldwide pattern among the lower income countries, since T. Paul Schultz (1988) has estimated that the per capita real expenditure on education has fallen from 1972-81 by 67% in a larger set of 39 lowest income countries (Bolivia is the lowest in our set of nine), and grown only 22% in the lower middle income countries. On the other hand, expenditure per pupil has grown 140% and 87% in the upper middle and high income countries, respectively (op. cit., pp. 551, 555).

Declines in Expenditure Per Pupil

Specifically, in the nine Latin American countries studied, education expenditure as a percent of GDP fell from 1980 to 1987 in all countries for which there is data except for Brazil, as shown in Table 2. However, the overall level of education expenditure in Brazil was the lowest in 1980 (2.96% of GDP) of all of these countries, far below the 6.6% of GDP spent in Costa Rica, the 6.8% in Jamaica, or the 5.0% in Venezuela. Following the replacement of the conservative military dictatorship in Brazil in 1985 with an elected government, Federal real per capita expenditures rose by 33%, or up to about 4% of GDP which is still well below other countries comparable per capita incomes.

The three countries suffering the largest decline in real per capita income are El Salvador, Argentina, and Bolivia shown at the bottom of Table 2. These are also the countries that had the largest percentage declines in real expenditure per capita on education, declines of -47%, -71%, and -37% from 1980 to 1985. These declines are continuing from 1985-1987 in El Salvador (-22%) and Bolivia (-28%), and although more recent data is lacking for Argentina, the extremely high inflation rates there currently and the economic distress do not bode well for education there.

Table 2

Real Expenditure Per Capita on Education, 1980-1988

Countries Ranked By 1980-86 Growth Rate, High to Lowest	As a Percent of GDP			Real Per Capita Exp., 1986 US $			Percent Change i Per Capita Exp.	
	(1) 1980	(2) 1985	(3) 1988	(4) 1980	(5) 1985	(6) 1987	(7) 1980-85	(8) 1985-8
Brazil	2.96[b]	3.11			71		+10%	+33%[e]
Costa Rica	6.60	5.00	4.90[e]	146[c]	99	98	-32%	-1%
Dominican Republic	Na	Na	Na	Na	Na	Na	--	--
Jamaica	6.80	4.80	6.00	118	77	102	-34%	+32%
Chile	3.52	3.91	3.06[e]	79	80	67	+1%	-16%
Venezuela	5.00	5.90	--	242	234	--	-3%	--
El Salvador	4.93	3.12	2.44[e]	51	27	21	-47%	-22%
Argentina	4.02	1.65	--	151	43	--	-71%	--
Bolivia	4.10	3.30	2.80	40	25	18	-37%	-28%
Average 9 LAC's								

a. Source: Patricio Marquez, Summary Data Base, June 1989, Table 10.
b. Estimate based on 1983 Education Exp. and on 1980-84 trend in Health Exp.
c. Estimate based on 1975 data.
d. For Brazil, Percent Change 1980-85 is for real Federal expenditure per capita only. From Brazil Report, Vol. 2, Table 7a, p. 39. The +33% in the last column is for real Federal expenditure per capita from 1985 to 1986.
e. 1987.

Box 1

Jamaica: An Illustration of the Dynamic Process and Its Effects on Education, Efficiency, and Equity

Jamaica offers an example of this pattern. With real GDP growing steadily from 1966 through 1974, and primary education already universal, secondary school enrollment ratios grew from 46% to 60% in 1979. See Jamaica Report (1988, pp. 37-8). With a larger percentage of females completing ninth grade, total fertility rates fell from 6.1 in 1966 to 3.7 in 1979, and have continued to fall to 2.8% in 1985.

But from 1974 through 1985, total real income fell by 32%, and real income per capita fell even further, with only a modest recovery beginning in 1986 (op. cit., p. 37). After a lag, real expenditures on education were cut by 31.7% from 1981 through 1985. Although expenditures per pupil have recovered somewhat from 1986-1988, the quality of education which has been a continuing problem in Jamaica deteriorated further during and following the decline. School supplies and the percent of the budget spent on texts were cut, in spite of the fact that most children lacked full-time use of texts until 1984. Maintenance was curtailed, and overcrowding, sewage, and vandalism problems grew (see Jamaica Report (1988, p. 22)). Limited but persuasive evidence from 1982 indicates that a large proportion of students who complete grade 6, perhaps as high as 50%, are functionally illiterate. Enrollment ratios at the secondary level, finally, declined from 1981 through 1983 from 61% to 58% (op. cit., p. 38).

Jamaica has now reduced the proportion of its education budget going to higher education (from 21.6% to 19.7%), using greater cost recovery in higher education, and provided tuition and fee waivers for lower income college students. But in spite of these important steps, there has been a considerable deterioration of primary education and other basic services available to the lower income population (op. cit., p. 1).

Declining Quality

The evidence based on several indicators for the Latin American countries studied indicates that the quality of education is low, especially in the lowest income countries, and also suggest that it has declined in the 1980s.

Quality can be low or decline either because at <u>given levels of efficiency</u> in the use of inputs, real expenditure per pupil is low, or falling so that there are fewer inputs, or because inputs are used in inefficient proportions and wastefully. The evidence although unsystematic and scattered is that low and falling expenditure per pupil, and inefficient use of inputs are both contributing to the lower quality of education in these Latin American countries.

<u>Quality Indicators</u>. Since the development of cognitive competencies in basic literacy and numeracy skills, in reading and problem solving skills, and in knowledge of the more important applied areas are key goals of education in most of these countries, achievement test scores in the basic areas of math, language, natural sciences, and social sciences are one very important indicator of the quality of output of the educational process.

As shown in Table 3, these achievement test scores can be seen to be positively correlated with per capita income across countries, and hence with per capita and per pupil expenditure on education. (Expenditure per pupil has an income elasticity of about 1.0 in the U.S., as shown in McMahon (1989) and about 1.4 to 1.6 across these low and middle income countries as estimated by T. Paul Schultz (1988, p. 555). So the income level of the country is highly correlated with expenditure per pupil). In the low middle and low income countries, math scores are 25% lower, reading comprehension scores are 37% lower, and science scores are 30-33% lower. The only exception is in China, a low income country where at the secondary level schools are very selective, science scores are only 2% lower than in the high income countries, and 6% higher than in the U.S.

This same pattern can be observed in those Latin American countries for which test scores data are available, although there are some exceptions to the pattern. It is where these exceptions occur that differences in efficiency in the use of resources in education may be able to explain the deviations. The highest achievement by this index is in Brazil and Argentina, which are also the highest per capita income countries. Expenditure per capita on education was lower in Brazil ($65) than Argentina ($103), and science scores were higher. The military dictatorship that had been in power in Brazil for many years prior to the election in 1984 held expenditure on basic education low, but heavily stressed science and technology, which may explain both the lower expenditure per capita and the higher test scores in science there.

Table 3

Quality Indicators: Achievement Test Scores
(Number of Countries for Which Data is Available in Parentheses)

Countries	Math Grade 8	Reading Grade 6	Science Grades 4-6	Science Grade 6	Science Grades 8-10
High Income, High Per Pupil Expenditure	.86 (13)	.94 (9)	.89 (10)	.90 (11)	.83 (11)
Upper Middle Income	.89 (3)	.77 (3)	.82 (6)	.66 (3)	.83 (6)
Lower Middle and Low Income Countries, Low Expenditure per Pupil	.64 (3)	.59 (2)	.56 (2)	.68 (3)	.65 (5)[a]

a. Excludes China

Source: Livingstone (1985), Heyneman (1980), and Unpublished International Evaluation Association data.

The quality as indicated by these science test scores appears to
be lower in Chile, El Salvador, and Bolivia. But given the amount
spent, the data suggest that the educational system in Chile is rela-
tively less efficient, and the educational system in Bolivia is rela-
tively more efficient per dollar spent. There is no systematic test
score data in Jamaica, a country below Chile and above El Salvador in
GNP per capita and in expenditure per capita on education. But only
about one-half of those finishing nine years of basic education acquire
fundamental literacy, reflecting long-standing problems with quality
there. (See Jamaica, 1988.) Many qualifications must be added, of
course, for the international conversion rates used for the currencies
and the representativeness of the national test scores. But given the
pattern in the broader set of countries, the pattern here and the
deviations from the pattern related to efficiency are suggestive.

Trends in test scores as an indicator of quality would be expected
to fall from 1980 to the present in light of the reduction in inputs
(such as textbooks, loss of the more able teachers, and reduction in
time on task associated with falling expenditure per pupil, Table 2)
and also due to lower efficiency discussed below. Little data is
available on test score trends in these Latin American countries
(which should be made a high priority item in all future Education
Sector Reviews). Table 5, however, reports trends in test scores in
Chile from 1984 to 1988, as well as trends in test scores in several
African countries that have also been experiencing falling expenditure
per pupil on education. The latter were collected very recently by
Gallagher and Ogbu (1989) with some assistance by McMahon, and add
additional insights and a broader perspective on the underlying process
which is the main subject of this discussion.

In Chile where real per capita expenditure on education fell by
16% from 1985 through 1987 (and a major decentralization of education
to municipalities accompanied by increased privatization occurred),
test scores in math, Spanish, natural sciences, and social sciences
fell universally in public and in private subsidized schools alike.
The fact that all test scores fell and by approximately the same
amounts is more significant than the fact that test scores fell
slightly less in all subjects except the social sciences in the
private subsidized schools because it is not known whether or not
parents of some of the better students were tending to withdraw their
children from the public municipal schools and transfer them to the
private nonsubsidized schools (not shown) and/or to the private sub-
sidized schools. There is no comparative test score data for any of
the other Latin American countries studied, a fact that is extremely
unfortunate, especially for El Salvador, Bolivia, and Argentina where
per capita expenditure cuts from 1980-85 were larger (-47%, -37%, and
-71%, respectively) and are continuing.

In Africa, however, a similar pattern can be observed. Again it
is unsystematic, because the data is so sparse, but nevertheless sug-
gestive. Those countries for which consistent and current data exist,
however, are shown in Table 5. They must be interpreted with caution

Table 4

Quality of Education (Achievement) and Expenditure
Per Capita in Latin America, 1980

Country	GDP Per Capita 1981[a]	Exp. Educ. as % of GDP, 1980[b]	Exp. Per Capita on Education[c]	Mean Test Scores in Science[d]
Argentina	2,560	4.02%	103	28.8
Brazil	2,220	2.96	65	33.0
Chile	2,560	3.52	90	20.8
El Salvador	650	4.93	32	20.8
Bolivia	600	4.10	24	24.8

Sources: a. World Bank, WDR, 1983.
          b. Patricio Marquez, Summary Data, Table 10.
          c. Col. 1 times Col. 2.
          d. Heyneman and Laxley (1983, p. 1162).

Table 5

Trends in Quality as Indicated by Test Scores
Percent Passing

Chile[a]	Public Municipal Schools		Private Subsidized Schools		Test Scores % Change 1984-88	
	1984	1988	1984	1988	Pub.	Pvt.
Math[b]	53.4	50.6	58.3	55.8	-5%	-4.3%
Spanish[b]	59.6	53.0	64.8	59.7	-11	-8
Natural Sciences	56.8	50.2	62.0	55.3	-12	-11
Social Sciences	63.3	54.3	67.6	58.2	-14	-14

Africa[c] Burkino Faso	1976 Test Scores	1985 % Pass	1985 Test Scores	1987 % Pass	1987 Test Scores	Test Scores % Change 1976-87
Primary	50		42		40	-20%
Secondary	60	(33)	52	(24)	45	-25
Vocational	36		35		35[d]	0
University	54		34		26	-52

Senegal	1976					
Primary	46.2		43		42	-9
Secondary	57.7		61		63	+8

Botswana	% Pass				% Pass Percentage Point Change
Primary	(72)	(72)	NA		0
Secondary	(52)	(66)	(83)		+14

Sources:
a. <u>Chile</u> Report, The World Bank (1987, p. 31).
b. Corrected to be comparable to the 1984 scores essentially by removing rural areas that were not in the 1984 sample. This correction is not available for the Natural and Social Science scores.
c. Gallagher and Ogbu (1989, p. 80) for Test Scores, and (op. cit., p. 78) for % Pass. Ethiopia was omitted because of the unusual conditions of war and famine there.
d. Average of 1983-87 since 1986 appears to be an outlier.

because they are affected by the percent of each age cohort that is enrolled, and by the selection process that affects who takes the test.

In Burkino Faso, which has been increasing the percent of its budget that it spends on education toward the relatively high current 19%, real per capita income has fallen by -.3% per year. But resources have been shifted away from secondary education toward higher education. And in secondary education, with this and with the expansion of enrollments, test scores have fallen 25 to 52%, at least in the short run. Teachers' salaries had crept up to 98% of the recurrent basic education expenditure budget by 1987, following large cuts in expenditure on textbooks and supplies, building maintenance, and construction. (See Gallagher and Ogbu, 1989, pp. 52-53 and Table 5.) It is possible that this is an example of a place where the resource mix has become relatively inefficient, as will be discussed farther below.

In Senegal, real expenditure on education has declined slightly from 1978 through 1987, so that with a 2.9% population growth rate, average expenditure per pupil has declined even more sharply (op. cit., p. 52). (Real income per capita fell by -.6%/year from 1965 through 1986.) Primary test scores declined by 9%. But at the secondary level, a new pre-test was added that screened out a number who otherwise would have taken the national baccalaureate exam, producing a somewhat artificial 9% increase in average test scores at the secondary level.

Botswana is the fastest growing country in Africa, with real GDP growing at 8.3% per year since 1965 and 8.9% for the later 1980-87 part of the period. (See World Bank, WDR, 1987, pp. 202-3 and 254.) It is one of the six fastest growing countries in the world, and spends a relatively high 18.7% of its national budget on education. This is typical of the other fast growing countries (e.g., Singapore 20.2%, South Korea 18.4%), and similar to only Venezuela (17.7%) and Costa Rica (19.4%) among the nine Latin American countries studied here. (Op. cit., p. 247.) Its expenditure per pupil at both primary and secondary levels grew faster than any of the other African or Latin American countries studied, and in this dynamic context, with both per capita incomes and teachers' salaries rising, teachers' salaries as a percent of recurrent expenditure fell from 54% in 1975 to 42% in 1984. (See Gallagher and Ogbu, 1989, p. 53.) Only 52% of the secondary school graduates passed the internationally standardized Cambridge exams in 1976, but by 1987 this percentage had jumped to 83%, and the proportion who obtained a grade 1 score has tripled since 1975. It is possible to conclude that in this case the efforts of the government to improve quality both by providing more resources and by improving efficiency in the input mix have been paying off.

Declining Efficiency

The kinds of improvements in quality associated with rising real expenditure per pupil and an increasingly efficient input mix such as that found in stable gradually expanding systems may not be possible during phases of economic decline affecting education such as that found in at least eight out of the nine Latin American countries studied. The shocking fact appears to be that not only does quality decline as expenditures per pupil and hence the quantity and quality of the inputs fall, but also efficiency is reduced. Declining efficiency then would logically act as an additional source of reductions in the quality (and quantity) of outputs.

The evidence relates to the effect of declining real expenditure per pupil on changes in the input mix, on the percent repeating, on the percent dropping out, and on time-on-task.

The Input-Mix. Internal ("X") efficiency is composed of technical efficiency (i.e., "getting down to the isoquant" from X to Y in Figure 1) which depends primarily on utilizing the best techniques suggested by learning theory, and price efficiency (i.e., moving along the isoquant from Y to E) until the most efficient "mix" between teaching materials, teachers' time, building maintenance, and other inputs is achieved. Economic efficiency (at E) requires the attainment of both technical efficiency and price efficiency. What follows first considers price efficiency, or the typical effects of economic decline on the "mix" of teaching materials, teachers' time, and other educational inputs.

Education in countries where labor is cheaper relative to capital, as it is in Bolivia for example, tends to be more labor intensive (e.g., with price ratios B_1B_1 at E) than in industrialized countries like the U.S. or Japan where labor is more expensive and the services of capital goods are cheaper (e.g., with price ratios given by U_1U_1 at Z). Teachers' salaries as a percent of the total education budgets therefore should be expected to be a larger percent of the budget in the lower income countries if the education system is to be efficient.

This pattern is evident in Bolivia and Jamaica, the only two countries for which such data is available in the World Bank Education and social sector reviews. Texts and materials, which are known to be relatively cost effective (see the survey of research on this by Fuller, 1987) are a very small .1% to 4% of education expenditures in Bolivia and Jamaica, compared to a much larger 10-19% of the education budgets in the U.S. and Japan. (See Table 6.)

Part of these low ratios are associated however with the 37% and 34% cuts in expenditure per capita on education from 1980 to 1985 in Bolivia and Jamaica, followed by a further 28% cut in Bolivia from 1985 to 1988. (See Table 2.) The hypothesis is that the things that get cut first are those things that are most easily "cuttable," not necessarily those things that are less cost effective. For example,
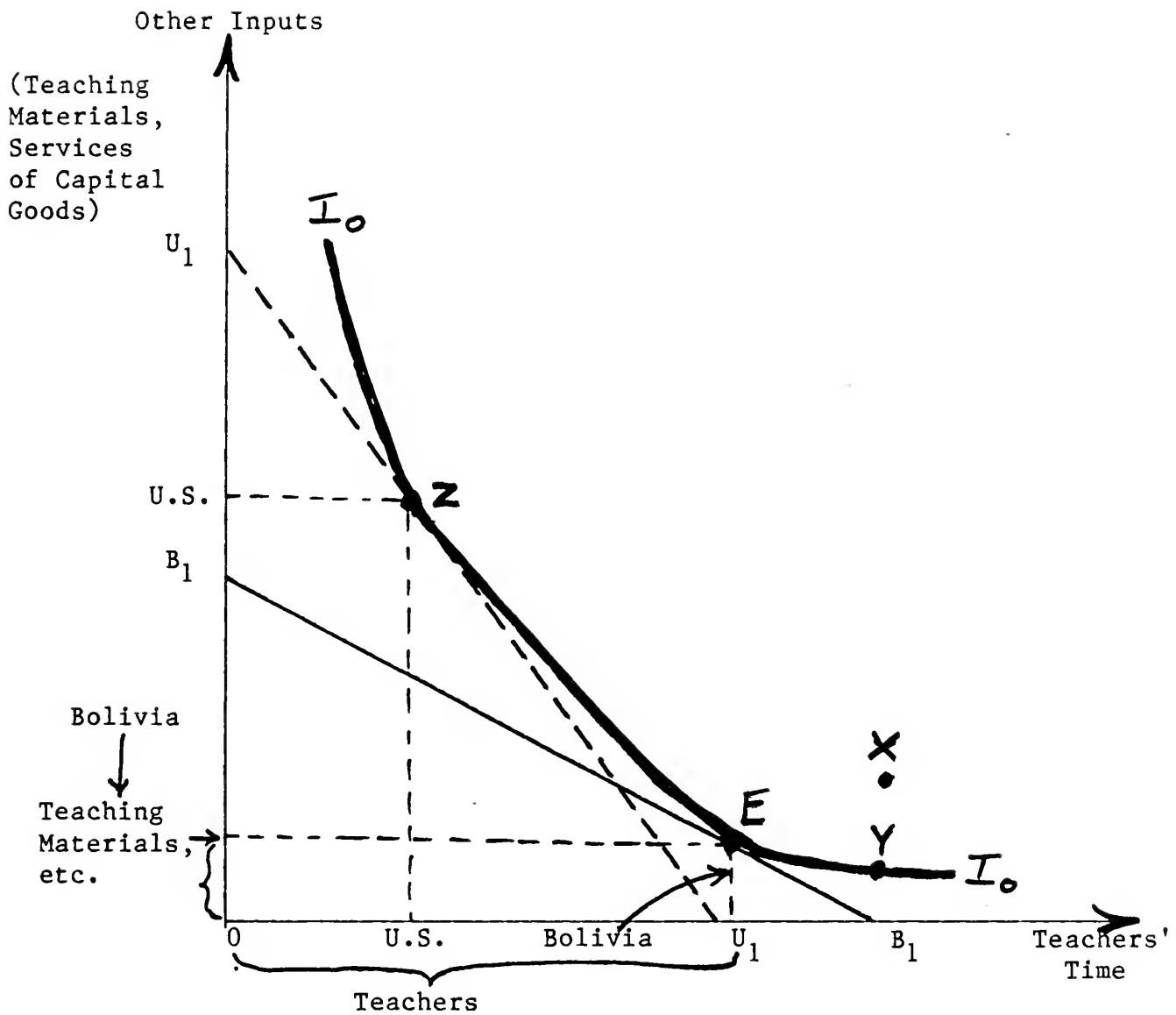
Figure 1

Internal Efficiency in Education

Table 6

Percent of Education Budgets Spent on Each Major Input

	Japan 1987	U.S. 1987	Jamaica 1983	Bolivia 1987
Texts and Materials	19%	10%	4%	.1%
Teachers' Salaries	48%	51%	70%	
Administrators' Salaries	8%	8%	11%	
Teachers & Administrators' Salaries	56%	59%	91%	98.1%

Source: Jamaica (1988), Bolivia (1989b).

construction, building maintenance, textbooks, and teaching materials
seem to be cut first, and with both enrollment and enrollment ratios
continuing to increase, teachers are not laid off, at least at first.

But their salaries fall in real terms given the high inflation
rates, teachers moonlight as in El Salvador (1989, p. 2) and Bolivia
(1989) working only half days in the public system, attrition of
teachers occurs, pupil drop-out rates increase (see below), and quality
deteriorates. Class size increases, and as budget cuts become more
severe, teachers are laid off. Administrators however tend to be
retained.

The data is not systematic enough for these nine Latin American
nations in the sector reviews being considered her to test this
dynamic-sequencing hypothesis adequately. But the pattern can be ob-
served in Costa Rica, El Salvador, and in the four countries in
Africa from which consistent data was collected.

In Costa Rica, where per capita income fell but at a relatively
modest -1.1%/year from 1980-86, real expenditures per capita on educa-
tion fell by 32% (Tables 1 and 2). Capital expenditures in education
fell more sharply, as would be expected typically throughout both the
public and private sectors, falling 72% in current price terms (Table
7) and moving from 26.8% of total expenditures on education in 1980
to 7.5% of total expenditures in 1987 (see Costa Rica, 1989, p. 6).
Enrollment continued to grow, especially at the secondary level with
39.1% of the children at that age enrolled in 1982 and 44.4% in 1986.
Real expenditure per student fell much more sharply at the primary
(-42%) and secondary (-37 to -39%) levels than at the higher education
level (-24%) (see Table 7), which suggests that equity was adversely
affected since higher education benefits primarily the higher income
families. With growing enrollments and much lower expenditure per
pupil at the primary and secondary levels, and expenditures on teaching
materials, equipment, and maintenance falling to less than 1% of the
budget, quality deteriorated and drop-out rates increased. As shown
in Table 7, the proportion of pupils admitted to the next grade fell 5
percentage points at the primary level (from 90% to 85.6%) and 10 per-
centage points at the secondary level (from 66.2% in 1980 to 54.4% in
1986).

In El Salvador, where the cuts in real per capita expenditure
from 1980-85 were more severe--47% from 1980-85 and have been
followed by a further -22% cut since 1985 (see Table 2)--there has
been a serious deterioration of the educational process. There have
been low levels of investment in new schools, books, and other teach-
ing aids. There has also been large reductions in teachers' salaries
in real terms, with average pay per teacher in 1987 less than half the
1979 level (see El Salvador, 1988, p. 3), although the number of
teachers has continued to grow at 1% per year. Teachers have gone to
half-time work schedules in the public sector, and the great fall in
real wages per hour has produced a weaker involvement of them with
their work. Many have turned to teaching a second term in the private

Table 7

Changes in Efficiency and Equity During Decline and Recovery

	Percent Change 1980-1984	Percent Change 1985-1987
Costa Rica[a]		
1. Current Expenditure, Current Prices[a]	+23%	+2.4%
Capital Expenditure, Current Prices	-72%	7%
2. Expenditure Per Student, in Real Terms:		
Primary	-42%	+12%
Secondary General	-37%	+18%
Secondary Technical	-39%	+26%
Higher	-24%	+18%
3. Percentage Point Change in Proportion of Pupils Admitted to Next Grade:		
Primary	-5	-.3
Secondary	-10	-2.2
Africa[b]		
1. Burkino Faso		
Real Salaries	8.6%	9.5%
Textbooks & Supplies	-11.7%	-38.9%
2. Cameroons		
Real Salaries	11.8%	4.4%
Textbooks & Supplies	9.8%	2.5%
3. Ethopia		
Real Salaries	12.1	--
Textbooks & Supplies	6.6	--
4. Senegal		
Real Salaries	10.0%	-.3%
Textbooks & Supplies	-4.1%	-3.4%

Sources: a.   Computed from Costa Rica (1989), (1) from Table 3, p. 6, (2) Table 5, p. 10, (3) Table 4, p. 8.
            b.   Gallagher & Ogbu (1989, Table III.2, p. 52).
            c.   1980-87 and 1987-88.

urban schools, which have been growing rapidly in the higher income
suburbs. (See El Salvador, 1988, p. 4.) The deterioration in quality
(and efficiency) is reflected in the increase in drop-out rates shown
in Table 8. The drop-out rates are enormous in the rural areas, 21%
per year during grades 1 to 3 and averaging 32% per year of those
students remaining during grades 4-6. The evidence is that the cuts
during 1978-86 of 56.8% in expenditure per capita had more adverse
effects in the rural areas.

This means a decline in the percent of pupils finishing primary
school. El Salvador has a very low completion rate (11.7% in Table
8), and the increase in drop-out rates lowers it about .8 of a per-
centage point further. Costa Rica's high 74.9% completion rate would
be lowered to about 70%. The direction of the effect on primary
school completion rates in all of the other Latin American countries
studied is expected to be similar, although the precise magnitude of
these trends from 1980 to 1985 to 1989 cannot be known until such
time as this specific data is collected.

II. Are Equity Objectives Served in the Financing of Education?

It is important to consider not just the adverse effects on
quality and efficiency of education in Latin America in the last
decade, but also the effects on the equity with which education and
other social services are distributed within the population. Educa-
tion (and health) differ from most other social services in that
their distribution is a distribution of investment in the future among
young children that enables their participation in the labor force and
a wider distribution of earnings later. The inequality in the way
education is distributed currently in these nations as between urban
and rural populations, and as between high and low income families, as
will be developed below, perpetuates inequality in the income
distribution in future generations. When budget cuts in education and
health bear disproportionately on the poor, this then can exacerbate
the inequality later and can lead to an increasingly volatile polit-
ical situation.

The degree of inequality in the income distribution shown in Table
9 can be seen to be greatest in Brazil. 66.6% of the income there
goes to the top 20% of the population. This is higher than any other
Latin American country in this study, much higher inequality than in
the three fastest growing countries in the world, and much higher than
in any of the major industrial economies as can be seen in Table 9.
The poorest 20% of the population in Brazil receives only 2% of the
income. This is less than in any other Latin American country, and
far less than the proportion of income received by the poor in the
three fastest growing countries or than in the industrial economies.
Of the other countries studied, inequality is highest in Venezuela and
Costa Rica, and lowest in El Salvador, although data are not avail-
able for Jamaica, Dominican Republic, and Bolivia.

Table 8

Efficiency Levels and Changes in Efficiency

<u>Percentage Change
1978-1986</u>

<u>El Salvador</u>

Real Expenditure Per Capita[a]   58.8%

Drop-Out Rates (Per Year)[b]	1986 Level		Percentage Point Change	
	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
Grades 1-3	5%	21%	-6	+.3
Grades 4-6	9%	32%	+5	+4
Grades 7-9	6%	16%	+.3	+3

<u>Percent Finishing Primary School, 1980[c]</u>		<u>Estimated Change 1980-1986</u>
El Salvador	11.7%	-.8 (from above)
Brazil	36.4%	
Venezuela	67.5%	
Costa Rica	74.9%	-5 (Table 7)
Jamaica	79.5%	

Sources: a. Patricio Marquez Summary Data, Table 11, for 1980-87.
             b. Computed from El Salvador (1988, Table 22).
             c. UNESCO (1984).

Table 9

Degree of Inequality and Trends in Inequality
in the Income Distribution

Latin American Countries Studied For Which Data is Available:	Percent of Income Received by the		Growth (Real Per Capita) 1980-86
	Highest Quintile	Lowest Quintile	
Brazil (1972)	66.6%	2.0%	.5%
Costa Rica (1971)	54.8%	3.3%	-1.1%
Chile	51.0%	4.0%	-1.7%
Venezuela (1970)	54.0%	3.0%	-2.0%
El Salvador (1977)	47.7%	5.8%	-2.2%
Argentina (1970)	50.3%	4.4%	-2.4%

World's Three Fastest Growing Countries (For Which Income Distribution Data is Available)

South Korea	45.3%	5.7%	6.8%
Hong Kong	47.0%	5.4%	4.8%
Japan	37.5%	8.7%	3.0%

Sample Industrial Market Economies

Germany (1978)	39.5%	7.9%	2.5%
United Kingdom (1979)	39.7%	7.0%	1.4%
United States	39.9%	5.3%	2.1%

Trends in the Degree of Inequality in the Distribution of Income

	Percent of Income Received	
Argentina	1974	1985
By Highest 10% in the Income Distribution	33%	37%
By Poorest 40%	16%	14%
El Salvador	1977	1985
By Highest 20%	47.7%	53.6%
By Poorest 20%	5.8%	3%

Sources: World Development Report (1988, pp. 272-3), except for
Chile from Chile (1987), Argentina from Argentina (1988,
p. 1), El Salvador from El Salvador (1989, p. 8).

Changes over time during the late 1970s and 1980s indicate that this inequality has increased, both as unemployment and underemployment increased in the early 1980s and as larger percentage budget cuts were made in the education in the low income and rural areas than in the high income urban suburbs. When real income falls in the low income segments of the population that are already near subsistence, there is less capacity to support education there, and apparently no significant increase in the willingness of the higher income groups to transfer tax funds for subsidies to the poorest areas.

Evidence consistent with this hypothesis for Argentina and El Salvador shows that the rich got richer and the poor got poorer in both of these nations from 1974 to 1985. In Bolivia (1989b) the reduction in the real income of teachers was associated with a deterioration in the quality, with the percent of teachers who are graduates of teachers colleges falling from 87% in 1980 to 74% in 1988, with 30% of the teachers in the low income rural sector internos (i.e., not qualified), 11% internos in the urban sector, and the shortage of teachers increasingly acute in the rural sector (op. cit., p. 4). Although real agriculture wages for farm laborers, the very poorest group in society, declined, the terms of trade improved for farmers, especially in those countries that devalued, and agricultural output as a percent of GDP increased in Brazil and Chile however (see World Bank (1986, p. 15), Poverty in Latin America: The Impact of Depression).

The main differential effect occurs in education because children from low income rural and urban families are most heavily dependent on the public schools. When expenditure per pupil is cut, they are the ones most directly affected. Higher income neighborhoods are more able to supplement teachers' salaries and teaching material budgets with special fees, and as quality falls, to switch their children to private schools. This effect is illustrated in El Salvador (1989, p. 3) where private basic education enrollments grew at a 17.4% annual rate increasing their share of total enrollments while public school enrollments increased at only 3.1% (op. cit., p. 3) during the time that real teachers' salaries fell by 1987 to less than half their 1979 level (op. cit., p. 3).

Consistent with this pattern, drop-out rates tend to be highest, and to increase the most, in the primary schools in the poor districts (Argentina, 1988, p. 8). As early as 1981, 26% of the schools in the poorer districts were on a reduced daily schedule and accommodating three shifts, compared to 12% in the urban Buenos Aires area (op. cit., p. 7), and real teachers' salaries fell a further 71% at the primary level, 58% at the secondary level, and 67% at the University level from 1980 through 1985 since that time (Argentina, 1988, Table 7.4, p. 96).

A further differential effect on the poor has occurred in some of these countries because primary education budgets, from which a larger percentage of the benefits go to the poor, were cut by larger percentage amounts than higher education budgets. The distribution of public education expenditures by income group is shown in Table 10 for Argentina. The lowest income group receives 34% of the benefits from the primary and secondary education budgets, and only 8.3% from higher education to which they frequently cannot gain access. In contrast, the highest income 20% gets 38% of the benefits from higher education.

This is typical of the pattern in the other Latin American countries studied, as is shown in Table 11. For those countries for which data is available, the situation is most severe in Columbia and Dominican Republic, where the poorest 40% receive only 6% and 2%, respectively, of the benefits from higher education, and the richest 20% receive 60-76% of these benefits.

III. Major Issues and Policy Options

There are problems with low and declining levels of quality and of efficiency in education in these Latin American nations in the 1980s and a failure of many of the central government expenditures on all levels of education to adequately reach the poor. The two prior sections have sought to analyze this process, or _why_ this is occurring. Part III will turn to a normative analysis, or, given the diagnosis of the problems and the nature of the process, what can be done about them by means of viable policy options.

To summarize the major conclusions from the positive analysis, they should be qualified by the fact that the data in the sector reviews (World Bank 1987-89) is not systematic and is spotty. But conclusions regarding the process draw also on an analysis in greater depth of the forces driving school expansion and decline in McMahon (1989a). They also draw on more systematic data from other World Bank (1988) sources. The major conclusions are that:

1. Cuts in real expenditure per pupil are associated with a decline in quality. At given levels of efficiency, this leads to less inputs and less time-on-task with adverse effects on test scores and other quality indicators.

2. Efficiency tends to decline as expenditures per pupil are cut, not to increase as some might think, and this effect accelerates the decline in quality. Price efficiency declines because some input prices and some budget categories are more inflexible than others, with adverse effects on the price efficiency of the input mix. Technical efficiency also tends to decline because of adverse effects on teacher motivation, drop-out rates, repetition rates, and other indicators.

Table 10

Distribution of Public Education Expenditures by
Income Group, Argentina, 1980

Income Quintiles	Primary and Secondary	Higher Education	All Public Education
Lowest	34%	8.3%	28.3%
2nd	23	9.1	19.9
3rd	18	17.5	17.9
4th	14.1	27.1	17.0
Highest	10.9	38.0	16.9
	100%	100%	100%

Source: Argentina (1988, Table 7.9, p. 101), originally from IEERAL.

Table 11

Who Benefits From Education Subsidies?

		Percent of Government Expenditure on Education Received by Each Income Group			
		Higher Education		All Education	
		Poorest	Richest	Poorest	Richest
Country	Year	40%	20%	40%	20%
Argentina	1980	17%	38%	48%	17%
Chile	1980	12%	54%	48%	18%
Costa Rica	1980	17%	42%	42%	20%
Dominican Republic	1980	2%	76%	24%	33%
Columbia	1974	6%	60%	40%	21%

Sources: Jiminez (1987), World Bank (1986).

3. <u>Equity also tends to suffer, with adverse effects on the poor</u>
   <u>that are disproportionately large</u>. This occurs because the
   cuts absorbed by primary education from which the poor bene-
   fits tend to be higher than those for higher education in most
   but not all places. Also, cuts in public education from which
   the poor benefit tend to be larger than in those aspects of
   private education that are not subsidized and not operated by
   the church from which they normally benefit less. The impact
   on urban vs. rural expenditure per pupil is very important,
   but not readily available and needs further study.

The Economies of Decline: Policies for
Greater Efficiency and Equity

In light of the above, there are four major policy areas that need
to be addressed:

1. The Distribution of Spending Among Sectors and
   Sub-Sectors is Not Appropriate

More attention needs to be paid to the high social rates of return
to primary and secondary education in most of these countries, e.g.,
23.5% in Brazil, 16.9-24% in Chile, 82-17% in Venezuela. Investment
at these levels needs to increase by larger percentage amounts than
in higher education, where social rates of return are closer to 12 or
13%. (Psacharopoulos, 1985.) To fail to do this is a failure to
seize upon a key means of increasing efficiency in the use of re-
sources.

More attention also needs to be paid to the fact that there is
underinvestment in education in many of these countries in relation to
the level of investment in physical capital. In Brazil particularly,
only 3.11% of GDP was invested in all of education in 1985 (Table 2)
in spite of the fact that the rates of return to be realized from
increased investment in primary education were 23.5%. Aggregate
investment is low also in Chile (3.06% of GDP), in El Salvador (2.44%
of GDP), and in Bolivia (2.8% of GDP) in 1987. If rates of return to
physical capital are 10-11% in real terms in these countries, there
would appear to be overinvestment in physical capital and the dis-
placement of uneducated labor that is the result.

2. The Education Sub-Sectors Do Not Use
   Resources Efficiently

As developed above, the cuts in real expenditure per pupil (and
per capita) tend to <u>increase</u> the inefficiency in the use of resources.
It is <u>slow, gradual growth</u> in real expenditure per pupil that appears
to be most conducive to increasing the price efficiency with which
the inputs are combined and used, and equity is improved. Clearly
textbooks and teaching materials, which are known to be cost effective

(see Fuller, 1987), are cut too far, and administrators, which seem to be cut only in the last final stages of decline, are not cut far enough.

However, a more labor intensive (teacher intensive, administrator intensive) mode of production of education in lower income countries where capital is relatively much more expensive is economically efficient, and for that reason, should be expected to persist.

Within higher education, there is a vast amount of economic waste and inefficiency, especially in Brazil, Dominican Republic, and Bolivia among the countries for which there is data. The tax costs per student are extremely high, 17 times as high as primary education in Brazil, and 10 times as high as primary education in Latin America on the average as compared to only about three times as high as the tax cost per pupil in the U.S. As can be seen in Table 12, the industrial countries on the average spend only 19.1% of their education budgets on higher education, whereas every one of these nine Latin American countries except Brazil and Argentina are spending a larger percentage than that. This is so even though a smaller percentage of their population goes on to college.

The reason for this high cost is first the virtually free tuition and very low rates of resource recovery as shown in Table 13. Students are currently paying about 35% of the institutional costs of higher education in the U.S., and this amount is rising. But in Bolivia and Dominican Republic, only 1% of the costs are paid by the students (Table 13) largely because free tuition (and other stipends) are provided to students who are largely from high income families. Chile did raise tuitions in the late 1970s while drastically reducing the subsidies to the universities (see Chile, 1987, p. 32), thereby raising the amount of cost recovery to 25% (Table 12). But Chile failed to introduce a means testing system, and provide tuition and fee waivers on a more targeted basis to students from low income families, so by 1985 enrollment fell by 20,000 students and most of these students from lower income families were driven out.

A second major source of economic inefficiency in the use of inputs within higher education is the failure to use the more advanced graduate students as half-time teaching assistants to teach the beginning courses and as half-time research assistants to assist with research projects at the universities. Without this efficient arrangement, higher education would be so costly in the U.S. that it could not serve as large a fraction of the college age population. The diffusion of the technology to undergraduates and to industry is also greatly aided by not using full-time research assistants but instead using part-time graduate students who have contact with undergraduates and who constitute a constant flow of practically experienced and up-to-date natural scientists, life scientists, and social scientists into industry and government employments. These are sources of very major economies that could be used more extensively in Latin America.

Table 12

Percent of Education Expenditures
Allocated to Each Level

	Primary	Secondary	Higher	Percent Enrolled Secondary
1. Brazil	51%	--	14%	55%
2. Costa Rica	40	27%	33	40
3. Dominican Republic	39	21	22	30
4. Jamaica	32	35.3	20	81
5. Chile (1985)			30	20
6. El Salvador	64	8	27	27
7. Argentina	43	31	18	31
8. Bolivia	74.9	13.8	20	15
9. All LAC's above (1980)	50.9	25.6	23.5	48[a]
10. Industrial Countries (1980)	36.6	44.3	19.1	93[a]

Sources: Lines 1-8: Jamaica Staff Appraisal Report, Student Loan
            Project, Annex 1.
          Lines 9-10: The World Bank (1986a, Appendix Table 6) and
          (for the last column), The World Bank (1988, p. 280).

Notes: a. 1985

Table 13

Low Cost Recovery in Higher Education

	1980
Dominican Republic	1%
Bolivia	1%
Brazil	5%
Costa Rica	8%
Chile	25%

Source: World Bank (1986a, Table 7, p. 55).

3. The Method of Financing Primary and Secondary
   Education Is Not Conducive to Achieving
   Either Efficiency or Equity

The method for transferring resources from the central government
to the schools is typically through a series of informal negotiated
agreements, rather than through a more objective public "formula" that
both contains incentives to increase efficiency and provides for equity
by providing a floor or foundation amount per pupil. Whatever trans-
fer system is used constitutes a set of incentives, and many of the
incentives provided are often perverse. The result of a non-objective
formula is leakage, or funds that are drained off, inefficiency in the
form of high drop-out rates, and short school days (since the transfer
mechanism does not provide incentives for knocking on doors, or for
maintaining the length of the school day and school year), little
incentive for outcome-based instruction, and inequity.

An example of this is in Brazil, where the financing mechanism
consists of a set of opaque and highly politicized agreements called
convenios. Such a system does not equalize expenditure between urban
and rural children, but instead can be used to pay off those who offer
political support, and is open to other abuses.

This financing system is so central to achieving any significant
amount of reform in the efficiency and equity of the primary educa-
tion system in almost all of these Latin American countries that a
"Model School Aid Formula" that contains appropriate incentives has
been developed and will be discussed in detail in Part IV below.
Something more specific of this type that can be promoted by the Bank
is needed, since vague exhortations and isolated financing policies
can both be ineffective.

4. The Administrative and Budget Processes are Not
   Adequate for Targeting Education Spending to the
   Poor Who Have Been Most Severely Affected by the
   Education Budget Cuts and Initially Had the
   Greatest Need

The evidence presented in Part II of the great inequality that
exists in these countries, especially Brazil of those studied, and the
perverse incidence of the education budget cuts on the achievement
test scores and access to basic education by the poor offers ample
evidence (although from scattered sources) that the targeting is
inadequate.

In primary and secondary education, introduction and use of a
model school aid formula that contains a floor, or minimal amount of
expenditure per pupil whether in urban or rural areas, high income
neighborhoods or rural slums, is a necessary pre-condition. This
foundation level guaranteed by the central government for each child
in Average Daily Attendance would provide a greater degree of equality
of opportunity.

Within higher education, the failure to target tuition and fee waivers, as well as subsistence grants, to the able students from low income families results in these students merely being driven out of the system as fees are raised. An example of this is in Chile (1987, p. 32). When fees were raised in the late 1970s a loan program was set up. Outlays for universities fell from 40% of the education budget to 30% by about 1985. This is still high in relation to the 19.1% in the industrial countries (see Table 12) and still high in relation to the 23.5% in the other Latin American countries (see Table 12). Furthermore in Chile a smaller percentage of the college age population is enrolled than in the most of the industrial countries. Given Chile's failure to use a means test to target tuition and fee waivers to the poor, enrollments fell as was mentioned by 14% from 145,000 college students in 1975 to 125,000 in 1985 as shown at the bottom of Table 14. Nevertheless, the budget shift in Chile had high economic returns, since the rate of return to basic education is twice that for higher education, and the enrollment in basic education increased substantially. (See Chile, 1987, p. 32 and Table 14.)

The importance of using a means test to target education and health subsidies, including higher education tuition and fee waivers is brought out by the greater sensitivity to price increases among the lower income groups shown at the top of Table 14. In this interesting study of clinic and hospital use by adults and children, the price elasticities are four to five times larger for the lowest income quartile than for the highest income quartile. Furthermore, a very systematic pattern emerges. The price elasticities are systematically much larger (in absolute value) in the next to highest income quartile, which is a group that does have some degree of access to the universities, than in the highest income quartile.

The system for financial need analysis has been highly developed in the United States. This occurred initially in response to the desire of Ivy League institutions to not exclude able applicants from low income families, but later was expanded to provide nationwide access to higher education at lower total tax cost. The system has spread to Germany, and most other European countries, and most especially to South Korea and Japan for the same reasons. It has great potential for much more extensive use in the Latin American countries, and therefore will be developed in more specific terms as a prototype tool in Part V below.

IV. Incentives for Greater Efficiency and Equity in a Model School Aid Formula

The method by which financial resources are distributed by the central government to local schools constitutes a system of educational grants, or an implicit "school aid formula" that is inherently a set of incentives. These incentives can be perverse, encouraging inefficiency in the form of high drop out rates and low achievement as well as making few resources available to poor children in rural

Table 14

Price Elasticities by Income Level

Medical Services Use Rural Cote d'Ivoire	Highest Income Quartile	Quartile 3	Quartile 2	Lowest Income Quartile
Hospital Use by Adults	-.17	-.66	-.80	-.95
Clinic Use by Adults	-.19	-.59	-.65	-.73
Hospital Use by Children	-.31	-1.18	-1.38	-1.58
Clinic Use by Children	-.31	-.99	-1.12	-1.22

Source: Gertler and Van der Gaag (1988).

Education in Chile
1975 to 1984

	Higher Education	Basic Education
Percent Change in Subsidy	-25%[a]	30.4%[c]
Percent Change in Enrollment	-14%[b]	+89%[d]

a. Percentage-point drop from 40 to 30% of MOEC's budget.
b. Student Loan Program was implemented, but no means testing, and no need-based tuition and fee waivers or grants.
c. Percent increase in real expenditure on primary and secondary from 1979 to 1982.
d. This is percent increase in enrollment in pre-elementary only.

Source: Chile (1987, pp. 32, 87).

areas, for example. Or they can be positive, generating high per-
formance and a reasonable degree of equity among pupils, as well as
incentives for some decentralization of the financing.

The systems that exist often are perverse, and sometimes non-
objective. In Brazil, as mentioned above, money is passed from higher
levels to the level below through highly politicized informal argu-
ments called convenios. Each successive level keeps their cut, and
there is leakage before the resources ever reach the classroom and
individual pupils. Such systems are inefficient in the use of re-
sources at the most elemental level, not because people are inherently
dishonest, but because the system is susceptible to being used for
payoffs for personal political support, and there are not objective
criteria based on the number of pupils in average daily attendance
that are known to the local school administrator who can determine
whether or not the resources appropriated by the legislative body
actually reach the school. This use of objective published criteria
helps to police the system. Where the systems for distributing funds
contain perverse incentives and/or are nonobjective, little can be
done at the local level to overcome the inefficiencies and pupil
inequities that result.

Except for Brazil, the Latin American sector reviews considered
here do not address the financing of basic education in specific
terms, or deal with how the incentives in education grant criteria
work currently, or could be improved. The problem with exhortation at
too general a level is that when loan recipients lack understanding
what to do, little is done.

What follows seeks to develop in very specific terms a "model
school-aid formula" as a prototype tool. It explains the incentives
that it contains, with the view that it then could be modified,
adapted, and promoted for use in most of these Latin American coun-
tries. The need to make the financial transfer system more objective
is particularly acute in Brazil, where the inequity is greatest and
there is already considerable decentralization of education. But the
problem with high drop-out rates, lack of incentives for teachers to
stress outcome-based instruction, and the problems with inequalities
in the expenditure per pupil permeate all of these Latin American
countries and are widely discussed in the reports.

The Incentives Needed

The system of educational grants to localities needs to contain
incentives for efficiency, pupil equity, and decentralization of some
of the responsibility for financing and hence for decision making.
Each needs to be explained briefly, and related to the specific for-
mula that follows shortly.

Efficiency can be increased by incentives in the formula that
encourage attendance, reduce drop-out rates, discourage short school

days and too many holidays, and encourage a commitment to student achievement. This can be done by basing education grants on the number of <u>pupils in average daily attendance</u> (ADA), sampled at unannounced times by representatives of the central Ministry of Education, and included explicitly in the formula, rather than basing grants on opening fall enrollments. The latter is the practice currently in use in many of the Latin American (as well as African and South Asian) countries. The result is that opening fall enrollments are large, drop-out rates are very high, and teachers (or headmasters) have no incentive to "knock on doors." The grants also need to be contingent on a school day of minimum length and of a minimum number of days in school per year.

It is a common current practice to set teachers salaries centrally, as in Bolivia and Chile, for example, rather than locally, and to provide teaching materials from central warehouses. This contains perverse incentives that encourage short days, high drop-out rates, and wastefulness. If total local school budgets are dependent on the number of pupils in average daily attendance (ADA) times the number of full days in the school year, plus some outcome-based performance incentives, this establishes the fund out of which teachers are paid and materials are purchased, and sets up effective incentives to perform. Furthermore, knowing the number of pupils in ADA, the local district can then also objectively check the funds it receives against that standard and thereby police the system.

To provide stronger commitment to student achievement, both pre-testing and post testing is necessary. This does exist in many countries already in the form of school leaving exams at the end of primary and senior secondary schools. A commitment to outcome-based instruction can be fostered throughout the system if the financial incentives provided are tied to increments in these test scores (i.e., to value added) in basic science, language, social science, math, and other key areas. Such incentives can be introduced into the school aid formula in the form of pupil weightings. Although effective, this is controversial, so in those countries where this step is not feasible, the test score increments can be regarded as a refinement for introduction later.

<u>Equity</u> can be increased by reducing the vast inequality in expenditure per pupil that currently exists as between rural and urban areas and as between high and low income school districts. It is easy to measure expenditure per pupil, so a measure of the current degree of inequality using a Gini coefficient or other measure is relatively easy to obtain. Such a measure was not computed however in any of the education sector reviews for these Latin American nations in spite of the fact that this measure of horizontal equity among pupils is badly needed.

The most practical way to ensure that at least some minimal level of equity is maintained is for the Central government to guarantee, and provide for, a foundation level of expenditure per pupil. This

represents a floor below which the level of education will not be allowed to fall. This floor will be a larger percent of the total in those countries where the financing system is most highly centralized, and be a somewhat smaller but crucial percent of the average per pupil expenditure in those countries where local financing assumes a proportionately larger role.

To provide incentives for schools to not ignore the low income children within their district, a targeting of an additional portion of the grants to schools with a larger proportion of pupils in ADA from low income families encourages the staff of the school to seek out and try to retain such pupils. Where this is incorporated within the school aid formula, it can be done by means of pupil weightings. Any targeting of equalization grants by this or other means however requires that Census data be available covering income per capita for the local area, or else that some kind of a simple means test be used to determine the number of disadvantaged children from low income families that there are in a school district. This kind of a targeted grant, or grant component, introduces an element of tax equity as well since educational "effort" is usually larger as a percent of the tax base in the low income, low wealth areas (e.g., McMahon, 1978).

Decentralization. The education systems in most of these Latin American countries tend to be very highly centralized, except for Brazil where there is considerable decentralization and Chile where primary education was recently turned over to the municipalities. There are inadequate incentives for local assistance with the financing, especially in the higher income areas. The problem is that decentralization normally leads to great inequality in expenditure per pupil, based on differences in wealth in the local areas. So it is not conducive to equity that decentralization go too far, and any decentralization must also include some centrally guaranteed foundation expenditure levels per child to protect equity. At present however these are inadequate incentives through local decision making to involve the parents, and in other ways to monitor the efficiency of the local schools.

In Chile there has been administrative decentralization to the municipalities of primary education and to private sector schools, but the financing is still centralized. It will be interesting to see how long it is before abuses crop up, given that there is not shared local responsibility for financing. (See Chile, 1987, p. 30.) The local school district needs to have authority for setting a local school tax rate, based on the value of property, before there is any meaningful participation in the responsibility for financing. Although higher tuition and fees in higher education makes good sense, and in fact are badly needed, the use of fees at the primary and junior secondary level merely increases the drop-out and repetition rates. The families of students in higher education have generally much higher incomes and the ability to pay, and means-tested tuition and fee waivers can be used at that level to avoid these adverse effects. (See Part V below.) In contrast, given a goal of universal primary

and lower secondary education, this requires very large numbers of very poor people to send their children to school. A large fraction of these families do not have the ability to pay fees in excess of the foregone earnings costs they absorb. To use individualized means-testing instruments to sort out those who do have the ability to pay fees among large numbers of semi-literate parents while also ignoring the foregone earnings costs is not realistic. The fees charged in some countries at this level (enrollment fees, textbook fees, examination fees, etc.) tend also to ignore the large transportation costs and uniform costs already borne by some parents, and therefore merely cause high drop-out rates, especially in the rural areas.

To provide incentives for a degree of decentralization in financing, and hence in decision making authority, a matching provision needs to be included in the school aid formula. By this means any local property tax funds raised for the schools, usually expressed in terms of the locally (or provincially) determined property tax _rate_ levied for education, are matched at least in part by incentive grants from the central government. That is, all tax funds raised locally do not lead to merely an equal retraction of central government support. The latter provides a powerful disincentive that virtually precludes all local participation in financing.

At the point where the degree of decentralization has gone just far enough, there is a higher degree of local responsibility for stewardship of the funds. The administration of teachers' salaries needs to be more decentralized, even though most of the funds to pay the teachers continues to come from the central government.

Although cost recovery by means of fees at the _primary_ and _junior_ secondary level is not realistic, at the _higher education_ level it is badly needed, as indicated above. However, nothing has been said about senior secondary schools. Clearly eliminating room and board subsidies, and perhaps even charging some fees at this level in those countries where senior secondary education is still far from universal, is appropriate.

A Model School Aid Formula and Its Properties

Since greater equity among pupils, rather than tax equity among local taxing jurisdictions, is more important in these Latin American and African systems where the financing is more centralized, a foundation formula of the Strayer-Haig type rather than a resource-equalizer formula is more relevant to the problems. Such a formula is shown in Box 2. This formula then provides an _objective_ means of allocating resources among provinces and among schools that avoids favoritism and avoids encouragement of dishonesty. It provides objectively for:

1) Equalization (F), or pupil equity, a floor below which the level of education provided _to each pupil_, will not be allowed to fall.

Box 2

A Model School Aid Formula

The resources provided by the central government, R, for each pupil in average daily attendance, ADA, contains a foundation level, F, for equity among districts and a public weighting Pe for equity among pupils within districts, incentives for efficiency (i.e., ADA, D, and Po), and incentives for decentralization of financing (i.e., aTL, and T_o) as follows:

(1) $R/ADA = [F/ADA-aT(L/ADA)-B](Po+Pe+Pc)P$

where:

R/ADA = <u>Resources Provided by the Central Govt</u>, per pupil in Average Daily Attendance, times the number of full days that school is in session, D,

F/ADA = <u>Minimum Foundation Level</u> Per Pupil, in ADA

L/ADA = <u>Local Fiscal Capacity</u>, measured as assessed <u>value</u> of urban houses plus rural land within the local school district,

B = fees collected from parents,

T = the <u>Tax Rate</u> the Province allocates to the locality for the schools, and that the locality augments and passes on to the local schools. A minimum rate, T_o, can also be required if the schools are to receive any aid from the Central Government,

a = <u>A constant indicating the extent to which the local tax contribution</u> to the schools reduces the contribution made by the centrality, with $0 < a < 1$, and

P = <u>Pupil Weightings</u>, as described in the text.

2) <u>Incentives</u> (ADA) to operate schools efficiently, with low drop-out rates and by maintaining or increasing the time-on-task. The number of full days (D) is also an incentive to increase the time-on-task.

3) <u>Incentives</u> (P_o) to improve quality (and efficiency), by use of outcome-based instruction. P_o uses test score increments as a pupil weighting.

4) <u>Incentives</u> (P_e) to increase equity, a pupil weighting based on high concentration of poverty pupils.

5) <u>Incentives</u> (T_o) to decentralize, and to make a local tax effort. If T_o is a qualifying tax rate, this introduces a very strong incentive to at least achieve this minimum local effort.

6) <u>Incentives</u> (aTL) to increase the local tax effort above the qualifying tax rate level are provided by keeping "a" less than unity. If a = .8 for example, only 80 percent of the local contribution is subtracted from the amount coming from the central government, not 100 percent, providing an incentive to do more than the minimum.

7) <u>Tax equity</u> (L) is included by introducing the local fiscal capacity.

8) <u>Phasing-In</u> (P) of the formula can be accomplished by use of another pupil weighting. This weighting can start at numbers less than unity, and be increased gradually to unity (i.e., phased out) as the new formula allocations are phased in. That is, P could be set initially so that the formula exactly reproduces the current financial allocations. Then as the more objective criteria and incentives contained in this formula are brought to bear, this pupil weighting could be phased out.

There will also normally be additional mandates (e.g., to use a particular textbook or to pay teachers more who have more education). But most of the really important incentives are captured in the above formula, and yet allow for local discretion as to how to achieve the objectives.

As a result more decision making can be decentralized to the local schools, who now have the <u>incentives</u> to achieve the eight objectives listed above without so much regulation and delay. This is highly conducive to achieving greater efficiency, because the bureaucratic red tape and delays are reduced, and the local school committees can take more initiative and responsibility in responding to specific local problems. They have the incentives to be efficient and not waste resources, and the local people have more incentive to take action to support and to improve their local schools.

Programming the Model School Aid Formula

Most of the items listed above are included in specific cells in the cost analysis and LOTUS worksheet shown as Table 15 below. This worksheet has been developed both as a basis for doing more adequate cost analysis, and for use in adapting the formula to each country. The primary education breakdown in Table 15 would be repeated at the secondary level.

The formula given by equation (1) above can be programmed in LOTUS for use on personal computers in each country using information located in the specific cells of the Nationwide portion of the worksheet shown in Table 15. The computerized formula on LOTUS is shown in Box 3.

The formula can be applied to the data for each locality, inserting the new cost analysis and local attendance data on the LOTUS worksheet. Specific refinements need to be introduced for each country. As simulations are run, the first step would be to compare the amounts predicted by the model to the actual current allocations, and to gradually phase in the formula by phasing out one of the pupil weightings as P approaches unity.

Public Support of Private Schools. A completely separate school aid formula is needed when it comes to private schools, since the situation varies so widely.

In Chile, one approach that may warrant further study involves straight per pupil in ADA grants to private providers who are encouraged to open schools in poor areas. Another successful example is in Britain, where there have been public grants to private church schools for many centuries at the primary and secondary level. But there are also cautions, and things to be avoided, ranging from the promotion of a class structure by this means, to the use of cost-based reimbursement of private providers which has repeatedly proved disastrous to achieving cost effectiveness. For example, third party reimbursement of private health care providers in the U.S., and wasteful private sector VOTEC schools in the U.S. that vary widely from very high to very low quality are approaches to be avoided. Another potential problem is that as children are withdrawn from the public schools to attend parochial schools or other (sometimes racially "pure") academies, it tends to lead to a withdrawal of financial support by these parents from the public schools. The public schools then are left with a low income clientele and deteriorating quality, as has occurred in El Salvador.

Nevertheless, where the pitfalls indicated above are avoided, there are many successful private schools in Latin America, many of them Catholic.

Table 15

1 COST ANALYSIS BY PROVINCE.

2 EDUCATIONAL EXPENDITURE PER PUPIL, NATIONAL AND LOCAL, FROM PUBLIC AND PRIVATE SOURCES

3 For Use in Cost/Benefit Analysis by Region, for Analysis of Distributional Equity,

4 and for Use in School Aid Formula Development

5

6 Walter W. McMahon and Siti Sofiah   (in thousand)

7

	H	I	J	K	L		M	N	OP	Q
		Province Code	Region	Budget			Actual			
		1982	1986	Number	1982	1986	1982	1986		
11										
12 Expenditure and Enrollment										
13										
14 Nationwide Average				√						
15 Primary Schools										
16 Total Expenditure						71,174,767				
17 Enrollment (ADA)						24,508.515				
18 Expenditure per Pupil						2.904				
19										
20 Direct (Institutional) Costs, by										
21 Source						71,174,767				
22 Teacher Salary (Prov'l Gov't-HA)										
23										
24 National School Aid (SPP)						71,174,767				
25 1. Learning Process, Books						17,059,406				
26 2. School Administration						7,651,737				
27 3. Maintenance						3,316,050				
28 4. Teacher Welfare						31,971,666				
29 5. Book Report Fund						1,193,427				
30 6. EBTANAS (Tests)						6,469,462				
31 7. Certificate/Diploma Fund						1,229,374				
32 8. Inspectors Expenses						356,400				
33 9. Administrative						1,051,235				
34 10. Data Collection						876,010				
35										
36 Loan and Grant										
37										
38 Development Budget										
39										
40 Local Resources; Total						0				
41 1. Province-level Taxes										
42 2. Kabupaten-level Tax Support										
43 3. Parents Support - BP3										
44										
45 Indirect (Foregone Earnings) Costs										
46 to the Society										
47										
48 Number of Years to Completion						8.92				
49 Assessed Value of Property (L)										
50 Increments to Test Scores Over Time, P_o										
51 Percent of Pupils With Parental Incomes at or Below Poverty Line										

Box 3

Computerized School Aid Formula in LOTUS

| Variable | | CELL Col. & Row (1986 data) in LOTUS: |

R = Place Result produced by the formula in column (Q-24) of Table 15, near the actual to be seen in position (L-24).

ADA = (L-17), Table 15.

F = Foundation level set at .75 times nationwide mean expenditure per pupil found in (L-18).

L = Assessed Value (L-49). Data must be collected with the help of the Ministry of Finance.

a = .8, a constant. There is a policy decision here, in that raising above .8 lowers the incentive for the Provincial and Local government to support the schools.

T = .03, a constant minimum education tax millage rate, T_o, to start with. This is a policy decision that must be made as to where the floor is to be. As a larger local tax effort is made, T would rise.

B = Fees, Cell (L-43) in Table 1.

P_o = Increments to test scores obtained from pre-testing and post testing. $P_o = 0$ in those situations where these test score increments are not available.

P_e = Pupil weighting based on concentration of poverty pupils. $P_e = 0$ in cases where this data is not available.

P_c = Ratio of Av. Exp/Pupil ADA in Primary Educ. to National Average Expenditure per Pupil, at all levels, i.e., (L-18): (L18 + L54 + L86 + L118 + L150 + L181 + L213).

P = Phase-in weights. This pupil weighting can be varied also for purposes of simulation studies.

The LOTUS program for the Model School aid formula is:

$$(2) \quad (Q24) = [.75(L18)/(L17) - (.03).8(L49)/(L17)-(L43)]$$

$$[(L-50) + (L51) + (L18)/(L18 + L54 + L86 + L118 + L150 + L181 + L213]P$$

V. Equity and Efficiency in Higher Education

The financing of higher education is the source of a great deal
of inefficiency and also inequity in most of these nations in Latin
America. This is evident as was indicated earlier in the extremely
high cost per student relative to basic education, reflecting internal
inefficiency, the low rates of return to higher relative to basic edu-
cation reflecting external inefficiency, and often over 60% of the
benefits of public higher education going to the children from the
highest income group reflecting inequity. The failure to target
public services to the poor is probably worse in higher education than
in any other sector.

The policy changes needed are:

1. Tuition and fee increases, to cover 33% or more of institu-
   tional costs (needed in all countries except Chile),

2. Targeting of tuition and fee waivers, access to loans, and
   work-study, by requiring that an income criterion be imposed
   for eligibility (needed in all countries),

3. Use of part-time graduate student teaching and research
   assistants both to reduce costs and to diffuse technology.

4. Responsibility for student placement at the college and uni-
   versity level to improve communication with job markets, and

5. Incentive schemes based on outcome-based instruction and
   outcome-based university performed research.

Tuition and Fee Increases

There is a large and relatively untapped potential for financing
the continuing expansion of higher education in these and other Latin
American countries by means of resource recovery from those who have
the ability to pay. An objective system for targeting of the subsidies
to those who need them, rather than those who do not, requires a more
refined family financial need analysis statement and computerized pro-
cedure than is in use in any of these countries at present. It is the
reasons for this, and the specific methods of accomplishing it that
are the primary focus of the remainder of this section.

Tuition, fee, and room and board subsidies should be implemented
by gradual annual increments rather than by discrete large jumps to
avoid the conflict that otherwise ensues. "Grandfather clauses" are
also a useful tool to avoid destroying the expectations of current
students that produces these reactions. With three to four years to
phase in the changes, a gradual improvement in the targeting not only
of the remaining tuition and fee waivers but also of student loans
(which usually are subsidized) and of work-study opportunities can be

implemented by means of a Family Financial Statement filled out by the parents and processed by a computer in a centralized location. The cost of this is extremely low, considering the benefits to greatly improved targeting, reduced "leakage" through greater objectivity, and increased efficiency in retaining access for the nation's pool of able students from poor families. The administrative costs for $3.6 billion of U.S. Pell Grants in 1985 were only 4.2% of the benefits, much of which is covered by the $7.00 fee (in 1989) paid by the parents who are applying for tuition and fee or room and board aid (see Jiminez, 1989, Table 3, p. 55).

The alternative to doing this merely drives out the students from low income families as occurred in Chile where a 14% enrollment reduction occurred following about a 25% reduction in higher education subsidies. This was in spite of the fact that a student loan program was implemented (see Table 14 above and Chile, 1987, p. 32.).

Student loans are a help, but they are only one part of a student's financial aid package which should also include tuition and fee waivers, fellowship grants, and work-study. All of these can and should be means-tested in one step. Reports based on objective analysis of one Family Financial Statement are sent to each campus at which the student applies to be used to means-test each component of the aid package. So the financial need analysis needs to be done only once, and can then serve to means-test all sources of aid.

If loans are the only source, and there are no tuition and fee waivers or other student aids, the students from poor families must borrow very heavily. This constitutes a substantial deterrent. If the students largely from high income families who do enroll are less talented or less motivated than those who are too poor to attend, the selection of students is inefficient. In Columbia, for example, 54% of the first-year students in higher education scored lower on aptitude tests than the corresponding cohort of secondary school graduates that did not enroll. (See World Bank, 1986, p. 12.)

In Jamaica, the World Bank required a policy to improve student aid as an offset to the impact on the poor of recent increases in student fees (see Jamaica, 1987). But this is the only Latin American country to date where this has been done. (See Jiminez, 1989, Table 6a, p. 59.) And no tuition and fee waivers were provided, or no income criterion was imposed for eligibility. Similarly in Chile, as mentioned above, no income criterion was imposed and coherent comprehensive student aid packages were not set up. Similarly, a student loan scheme has been required as a part of fee increases in Senegal, Malawi, Zaire, Ghana, Korea, and Indonesia. But again no income criterion or more comprehensive student aid package was required. In the recent World Bank loan to Morocco, the education sector loan requires an increase in fees, and that there be an "income criterion for fellowship eligibility." (See Jiminez, 1989, Table 6a, p. 59.) It is this requirement that should accompany higher education resource recovery requirements in all future World Bank education sector loans.

In Costa Rica, for example, 70% of the students have scholarships although three-fourths of them come from the upper two quintiles of the income distribution. (See Costa Rica, 1989, p. 11.) At the same time, these scholarships cover only tuition in part, and not housing, food, or other maintenance costs, so they do not allow students from poorer economic backgrounds to attend the university.

A Specific Family Financial Statement Prototype Tool

A model Family Financial Statement for collecting the necessary financial information to determine the "parents' expected contribution" is shown in Box 4. It reflects conditions found in these Latin American countries, although it has been adapted from one devised for Indonesia (see McMahon, 1988, pp. 142-3) and could easily be adapted for use in other developing countries.

The conditions it reflects are those of a relatively larger rural sector than that in the industrial countries where these types of instruments are widely used in the financing of higher education (see Johnstone, 1986, for an excellent survey). The form may be thought of as illustrated for Brazil, where only 5% of higher education costs are recovered by fees. There a military dictatorship that was in power until after 1984 put large amounts into high cost courses that supported technology and military needs, and past traditions there use a non-objective system more open to personal favoritism. (Also Brazil's total public education budget is only 2.96% of GNP, the lowest in Latin America (Table 2) with relatively little support for primary education in the rural areas.) Fewer pay income tax and the extended family has a more important role.

The form must be filled in by the parent, not the student, who has access to records and knows his or her income and assets. It must be countersigned by the student, which emphasizes the shared responsibility for financing and helps the system to be self-enforcing. The form emphasizes that it is an application for financial aid, although of course it is really a self-assessment. It leads up to a "parents' expected contribution" later which will be a matter between the parents and their child, and there is no tax collector involved. The form is not a mark-sensed form because most parents in Latin American countries are not likely to be familiar with these. But the cost of clerical labor to transform the data onto a personal computer file would be relatively low, and mark-sensed forms also could be used where that is desirable.

Demographic Information as a Basis for
Parental Living Allowance Deductions

No questions are asked on this form except the one about financial assets (on which there has been quite a bit of research by Robert Ferber) that are not either self-veryifying in the sense that their

Box 4

Application for Financial Aid And Family Financial Statement
A Prototype Tool Needed for Better Targeting

To be filled in by the parent of a student seeking financial aid. Mail to
(a private firm such as American College Testing),* for processing.

Warning: All information is subject to verification. If you purposely give
false or misleading information to establish eligibility for student aid,
you can be fined, receive a prison sentence, or both.*

1. What university does your son or daughter plan to attend, or
    attend now?
    _____
                College Name and City
2. Student son or daughter's name: _____
                                        Last   First   Middle
3. Parent's name filling out this form: _____
                                            Last   First   Middle
4. Parent's home mailing address: _____
                                      Number Street City Province
5. Student's next year in college: ___ Freshman ___ 2nd ___ 3rd
                                    ___ 4th   ___ 5th
6. Parents' marital status: ___ Married ___ Divorced ___ Father Deceased
7. Age of the older parent is _____ years.
8. Number of family members that you support:
    a. Number of your children that will be receiving over one-half of
        their support from you next year (include the student): _____
    b. Number of other family members to be living at home and receiving
        one-half of their support from you. Include elderly parents,
        grandchildren, and other family members here: _____
    c. Number of children of those included in question 8a to be away at
        a boarding school or college next year: _____
9. Do you have a tax number? ____ Yes ____ No. If so, what is it?
    (If you did not file a tax form last year, skip the   _____
    next section, and go to the family financial infor-   Tax Number
    mation section beginning with question 14.)

PARENTS' FINANCIAL STATEMENT

Please refer to your most recent (Tax Form) to complete the next few
questions:

10. What is the total income of your family for the year just ended re-
    ported on line ____ of your (Tax Form)?   _____
    (This includes your wife's income, and that of other family members
    living with you who work.)
11. What are your total assets reported on line ____ of your (Tax Form)?
                                                                _____
12. How much tax did you pay, based on this tax form?   _____

*For illustrative purposes only. This is the practice in the United States.

13. What are the specific assets reported on line _____ of your tax form?

	Value Now		Amount Owed
Parents' home	_____	Home Mortgage	_____
Financial assets and investments	_____	Other bank debt	_____
Other real estate, business, or farm	_____		

14. What kind of a house do you have?
_____ Brick house
_____ Half brick
_____ Wood or stone

15. How many hectares do you own, if any? (Insert here number recorded at the Province level for the property tax): _____ hectares

16. What is your occupation? _____

17. Do you have: _____ Horses? _____ Tractors?
_____ Electricity at home? _____ A car?
_____ A color TV? _____ A telephone at home?

18. How many years of basic education have you completed? _____
Of College? _____

STUDENT INFORMATION

19. With whom will you live next year while in college?
(a) At home with parents (if parents live near enough to the college). . . . . _____
(b) College dormitory or rented room . . . . _____
(c) A brother, uncle, or other relative . . . . _____
(If you answered 19(a) or 19(b), skip the next section and go to question 22.)

INFORMATION ABOUT RELATIVE WITH WHOM YOU WILL LIVE

20. What is the name and address of this brother or other relative with whom you will live? _____
         Name   Address

21. Does this member of your extended family have a tax number?
_____ Yes _____ No   If so, what is it? _____

22. Approximately how much tax did he pay?
_____ None _____ Rp. _____ Don't Know

23. What is his occupation? _____
What is his rank (if in the military, or civil service)? _____

24. Approximately what is his income? _____

CERTIFICATION AND SIGNATURES

I certify that the information on this form is complete and correct. If necessary for verification, I permit an authorized official to make inquiries, and agree to send a xerox copy of my last Tax Form if asked. I do realize that if I don't respond to the request for proof when asked, the student will not receive financial aid.

At least one parent must sign: _____ _____
                                    Parent's Signature   Date

Student must also sign: _____ _____
                              Student's Signature   Date

answers are readily observable to the student or others who know the family, or else that could not be verified should the need arise. This simple principle encourages honesty.

The identifying information in questions 1-5 provide the family and college financial aid officer addresses to which the results containing the parents' expected contribution and the results of the financial aid awarded can be mailed. The demographic information in questions 6-8 provide the basis for computer calculations described later that set aside parents' living and retirement allowances.

Income and Assets for Those Who File
Tax Forms (Questions 9-13)

If the country issues a tax (or social security) number it usually means that the parent is employed as a civil servant or by a private firm. Income information is requested from a specific line of the tax form that must be filed (Q. 10), which increases the accuracy with which it is reported and permits verification later. It includes the income from "second jobs," the wife's income, and the income of other family members. Assets are reported on another page (Q. 11-12), and also could be verified if the form is selected for auditing. This information therefore piggy-backs on the enforcement by the Ministry of Finance of the nation's tax laws.

Estimating Income and Wealth for Those
Who Do Not File Tax Forms

Questions 14-18 that follow get away from using the favoritism-ridden subjective practice frequently used of asking the student or neighborhood leader to report the parents' income or wealth.

Questions 14-18 are for those who do not file tax forms, many of whom are in rural villages where non-market aspects of the economy loom more important. Occupation and education can be used for estimating income. The national labor force surveys collect detailed information on income from a large sample of persons in all provinces that can be used for imputing income and for checking returns for reasonableness. Questions 14, 17, and 18 about the kind of home, electrification, cars, and TV are similar cross-checks.

Questions 19 and 20 ask whether the student will live at home or with a relative. If so, living cost subsidies are not needed. If the brother or uncle has high income as revealed by questions 21-23, a student tuition loan without a tuition waiver might be more appropriate.

Criteria for Computing the Family's Expected Contribution

The parents' expected contribution can be computed based on this information about the parents' income and net assets, and the income of any supportive member of the extended family. The computer must be programmed to deduct a standard maintenance allowance for the parents from the income of the parents and their other dependents, as well as setting aside a retirement allowance from net assets for the parents.

The Standard Maintenance Allowance is based on national surveys of consumption resulting in a cost estimate for families with specific numbers of dependents. It must be adjusted annually by a consumer price index to reflect the inflation rate expected in the upcoming year. Available income is total family income less this allowance. It is the discretionary income available for supporting the family's living standard above the standard level as well as for financing the higher education of the children.

Wealth. The treatment of the parents' assets within the computer program must first subtract the debt reported on the form to obtain net worth. Then a fraction of the net value of the home and other assets are protected to provide for the parents' retirement. The fraction increases with the age of the eldest parent. The formula for the amount of assets set aside is based on the current cost of an annuity that would provide the parents a moderate level of living throughout their retirement years. Future inflation must be built into this formula using the inflation rate specific to each country. An allowance also needs to be made for social security where a social security program exists. Life expectancy data can be obtained from the World Bank's World Development Report (1989) statistical appendix for each country. The annuity formula used by the ACT Uniform Methodology ignoring loading charges is:

$$A = M(1+p)^{(L+n)/2} \left(\frac{[1-(1+r^*)^{n-L}]}{r^*}\right)(1+r^*)^{-n}$$

A = asset protection allowance,

M = moderate budget for a retired couple,

p = expected average annual rate of inflation,

L = life expectancy, less current age (from form),

n = retirement age, less current age (from form),

r* = rate of return on the annuity.

The resulting asset protection allowance which depends on the parents' age can also be stored in the computer, and is deducted from total assets to obtain "Discretionary Net Worth."

Finally, the parents' expected contribution is computed by adding discretionary net worth and the parents' available income, and applying a suitable tax rate (see McMahon, 1988, p. 146). The student's unmet need is calculated by subtracting this amount from the tuition, fee, room, and board costs at the college of his choice. It is only this parents' expected contribution and unmet need totals that are sent to the campus financial aid officer for use in administering tuition and fee waivers, maintenance fellowships, student loans, and work-study.

VI. Conclusions

Tables 1 through 15 and the theme elements that they support suggest a framework for collecting consistent data in the countries in which items are missing, as well as providing a framework for extending the analysis to other countries in the region. For more rigorous social scientific analysis it is important that consistent data be collected in all of the countries covering the key items.

It is concluded that there has been a deterioration in the quality of education following relatively large reductions in real per capita expenditure on education from 1980-85, expenditure cuts that ranged up to 32-71% in five of these Latin American countries. There has been some recovery in investment in education in Jamaica and Brazil, but further deterioration in the other countries since that time. Some limited evidence suggests that there was also a reduction in efficiency as expenditures were cut. It is clear that the economic decline led to greater inequity within education, with a disproportionate burden on the poor.

Many policy options were suggested for increasing efficiency and equity in investment strategies and improving the incentives for efficiency within both basic and higher education. The Bank needs to examine its own investment policies to be sure that it is not encouraging inefficient strategies, e.g., too much invested in higher education, or in separately tracked VOTEC schools, or in physical capital, and too little in the primary and secondary levels, texts, and teaching materials where the rates of return and cost effectiveness often are higher. Loan conditions also need to require more effective targeting. Finally, two specific "prototype tools" are suggested for potential further development and use in improving efficiency and equity in the financing of basic education and in the financing of higher education.

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